Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (currently amended) Method for the manufacture and transmissive irradiation of a sample, comprising the steps of:

A Providing a particle-optical system having an internal low-pressure chamber and suitable for the generation of an electron beam and an intersecting ion beam in said chamber;

B Providing a specimen within the chamber, carried by a manipulator;

C Irradiating the specimen with the ion beam so as to cut a sample from the specimen;

D Relatively displacing the sample thus cut to a sample holder than can be manipulated;

E Attaching the sample to the sample holder; and

F Using an electron beam to perform transmissive irradiation of the sample thus attached to the sample holder,

characterized in that step F is performed in the low-pressure chamber of the particle-optical system according to step A.

2. (currently amended) Method according to claim 1, characterized in that, during step F, an electron detection surface is positioned at the side of the sample opposite to the surface upon which the electron beam impinges.

3. (previously amended) Method according to claim 1, characterized in that, after executing step E, the sample is irradiated with the ion beam, for the purpose of further processing the sample.

4. (previously amended) Method according to claim 1, characterized in that, after execution of step E, the sample holder is rotated about a rotational axis that is perpendicular to the electron beam and to the ion beam.

5. (original) Method according to claim 4, characterized in that the rotational axis extends through the point of intersection of the electron beam and the ion beam.

6. (previously amended) Method according to claim 4, characterized in that rotation

about the rotational axis is performed, in combination with rotation of the sample holder about a manipulator rotational axis that extends parallel to said rotational axis, through a range of at least 180 degrees.

7. (currently amended) Particle optical system~~, in particular for application in conjunction with a method according to one of the preceding claims,~~ comprising a low-pressure chamber containing manipulator means for at least two objects to be irradiated, an electron source and an ion source for the purpose of allowing irradiation of an object, carried by the manipulating means, using an electron beam and an ion beam, respectively, the manipulating means comprising a number of first manipulation parts, which are movable relative to one another and collectively movable relative to the electron beam and the ion beam according to a first set of degrees of freedom, ~~an extremal~~ one of which first manipulation parts ~~comprises~~ comprising a first object carrier, for allowing, in the case of a first object carried by the first object carrier and at a first position of the manipulating means, reflective irradiation of said first object using an electron beam and/or irradiation of said first object using an ion beam. the manipulating means further comprising at least one second manipulation part comprising a second object carrier, the system further comprising displacing means for relatively displacing an object from the first object carrier to the second object carrier, characterized in that the manipulating means are embodied so as to allow, in the case of a second object carried by the second object carrier and at a second position of the manipulating means. transmissive or reflective irradiation of said second object by an electron beam and/or irradiation of said second object by an ion beam.

8. (original) System according to claim 7, characterized in that the second manipulation part is movable in at least one further degree of freedom with respect to the electron beam and the ion beam, as well as with respect to a remaining portion of the manipulating means.

9. (original) System according to claim 8, characterized in that the at least one further degree of freedom is a rotation about a rotational axis that extends perpendicular to the electron beam and to the ion beam.

10. (original) System according to claim 9, characterized in that the rotation about the rotational axis can occur through a range of at least 180 degrees, combined, if desired, with rotation about a manipulator rotational axis that extends parallel to said rotational axis.

11. (original) System according to claim 10, characterized in that the rotational axis extends through the point of intersection of the electron beam and the ion beam.

12. (previously amended) System according to claim 8, characterized in that the motion according to said at least one further degree of freedom can only occur in combination with motion according to one degree of freedom of the first set of degrees of freedom.

13. (currently amended) System according to ~~one of the claims~~ claim 7, characterized in that the system comprises an electron detection surface at the side of the second object – carried by the second object holder – that is remote from the electron beam.

14 (original) System according to claim 13, characterized in that the electron detection surface is collectively movable with the manipulating means in the direction extending between the first position and the second position of the manipulating means.

15. (original) System according to claim 14, characterized in that the electron detection surface and the manipulating means are movable independently of one another in the direction extending between the first position and the second position of the manipulating means.

16. (currently amended) System according to claim 14, characterized in that ~~the~~ a ~~resilience of~~ spring means causes the electron detection surface to move together with the manipulating means from the first position to the second position, and a stopping contact between the manipulating means and a part rigidly connected to the electron detection surface causes the electron detection surface to move together with the manipulating means from the second position to the first position.

17. (original) System according to claim 16, characterized in that, in the second position of the manipulating means, there is play between the manipulating means and the part rigidly connected to the electron detection surface.

18. (previously presented) Method according to claim 2, characterized in that, after executing step E, the sample is irradiated with the ion beam, for the purpose of further processing the sample.

19. (cancelled)

20. (previously presented) Method according to claim 3, characterized in that, after execution of step E. the sample holder is rotated about a rotational axis that is perpendicular to the

electron beam and to the ion beam.

21. (cancelled)

22. (previously presented) System according to claim 9, characterized in that the motion according to said at least one further degree of freedom can only occur in combination with motion according to one degree of freedom of the first set of degrees of freedom.

23. (cancelled)

24. (cancelled)

25. (previously presented) System according to one of the claims 8, characterized in that the system comprises an electron detection surface at the side of the second object – carried by the second object holder – that is remote from the electron beam.

26. (previously presented) System according to one of the claims 9, characterized in that the system comprises an electron detection surface at the side of the second object – carried by the second object holder – that is remote from the electron beam.

27. (cancelled)

28. (cancelled)

29. (cancelled)

30. (currently amended) System according to claim 15, characterized in that ~~the~~ a ~~resilience of~~ spring means causes the electron detection surface to move together with the manipulating means from the first position to the second position, and a stopping contact between the manipulating means and a part rigidly connected to the electron detection surface causes the electron detection surface to move together with the manipulating means from the second position to the first position.

31. (new) A particle optical system for extracting a sample from a work piece and transmitting electrons through the sample, comprising:

a stage for supporting a work piece;

an ion beam column for producing an ion beam to cut a sample from the work piece, the ion beam column having an ion beam axis;

a sample manipulator for repositioning the sample cut from the work piece by the ion beam column;

an electron beam column for producing an electron beam for transmitting through the sample, the electron beam column having an electron beam column axis; and

an electron detector positioned to detect electrons transmitted through the sample,

the stage, the ion beam column, the electron beam column, the sample manipulator and the electron detector being positioned in a low pressure chamber to allow the sample to be cut, repositioned and have electrons transmitted through the sample and detected, without removing the sample from the vacuum chamber.

32. (new) The particle optical system of claim 31 in which the ion beam axis is tilted with respect to the electron beam axis.

33. (new) The particle optical system of claim 32 in which the electron beam axis is substantially vertical.

34. (new) The particle optical system of claim 32 in which the ion beam and the electron beam are substantially coincident on the work piece surface.

35. (new) The particle optical system of claim 31 in which the stage can be tilted.

36. (new) The particle optical system of claim 31 further comprising a sample holder for holding the sample while transmitting the electron beam through the sample, the sample holder allowing electrons in the beam to reach the electron detector.

37. (new) The particle optical system of claim 36 further comprising a movable support for selectively positioning either the stage or the sample holder under the electron beam to allow the electron beam to impact the work piece or the sample.

38. (new) The particle optical system of claim 36 in which the sample holder includes positions for holding multiple samples.

39. (new) The particle optical system of claim 36 in which the sample holder is rotatable to facilitate attaching samples using the sample manipulator and viewing samples.

40. (new) The particle optical system of claim 36 in which the sample manipulator can reach the work piece and the sample holder, so that the sample manipulator can transport the cut sample from the work piece to the sample holder.

41. (new) The particle optical system of claim 36 in which the stage and the sample holder are positioned on a first movable assembly and the electron detector is moveable relative to

sample holder.

42. (new) The particle optical system of claim 41 in which the electron detector is mounted on a second movable assembly, the second movable assembly being biased against the first moveable when positioned such that the ion beam and the electron beam can impact the work piece.

43. (new) A method of extracting a small sample and transmitting electrons through the sample within a low pressure chamber, comprising:

cutting a sample from a work piece using a focused ion beam in the low pressure chamber;

moving the sample from the work piece to a sample holder in the low pressure chamber;

attaching the sample to the sample holder in the low pressure chamber; and

directing an electron beam toward the sample in the sample holder in the low pressure chamber; and

detecting electrons transmitted through the sample in the low pressure chamber.

44. (new) The method of claim 43 in which cutting a sample using a focused ion beam includes directing an ion beam toward the work piece surface along a first direction and in which directly an electron beam to the sample includes directing an electron beam toward the sample along a second direction that is not parallel to the first direction.

45. (new) The method of claim 44 in which the electron beam and the ion beam impact at approximately the same spot on the work piece.

46. (new) The method of claim 43 further comprising detecting secondary electrons to form an image of the work piece or the sample.

47. (new) The method of claim 43 in which directing detecting electron transmitted though the sample includes moving an electron detector relative to the sample holder to position the electron detector under the sample.